Critical Care Medicine
XXX 2026 • Volume 54 • Number 00 • Pages XX–XX

REVIEW ARTICLE

Ten Steps to Improve Sepsis Care in Low-Resource Settings

OBJECTIVES: To develop a practical consensus-based framework for ten steps to improve sepsis care in low-resource settings (LRSs), aligned with the sepsis chain of survival and informed by global expertise.

DATA SOURCES: We reviewed peer-reviewed literature on sepsis epidemiology, prevention, recognition, and management in LRS; international guidelines, including the Surviving Sepsis Campaign; and prior "ten-step" consensus frameworks for resuscitation and emergency care.

STUDY SELECTION: A Task Force representing adult and pediatric sepsis care, emergency care, critical care, infectious diseases, public health, and implementation science identified key domains from the above data sources.

DATA EXTRACTION: With guidance from methodologists and implementation science experts, we employed an iterative, consensus-based process—literature review, Delphi survey, Utstein-style conference, stakeholder input, and public comment—to first define and then refine steps and implementation strategies.

DATA SYNTHESIS: The process resulted in ten nonsequential, actionable steps covering governance and commodities, provider and caregiver education, community and facility prevention, early recognition and rapid response, timely guideline-based interventions, structured post-sepsis care, data systems, quality improvement, a culture of excellence and respect, and holistic well-being of patients, caregivers, and providers. Each step includes a rationale and potential implementation strategies adaptable to local resources and needs. Collectively, the ten steps emphasize integration across the continuum of care, equitable access to essential interventions, and the role of emerging technologies to prevent, recognize, monitor, and follow-up sepsis.

CONCLUSIONS: The ten steps provide a consensus-driven roadmap for health leaders, clinicians, and policymakers to improve sepsis care, strengthen the sepsis chain of survival, reduce preventable morbidity and mortality, and address global inequities in sepsis outcomes.

KEYWORDS: emergency care frameworks; international collaboration; low-income countries; low-resource settings; public health policy; sepsis management

Teresa B. Kortz, MD, MS, PhD[1,2]
Jorge L. Hidalgo, MD, MACP, MCCM, FCCP[3]
Samuel O. Akech, MBChB, MMed, PhD[4]
Sheila N. Myatra, MD, FCCM, FICCM[5]
Ryan C. Maves, MD, FCCM[6]
Javier Perez-Fernandez, MD, FCCM[7]
Subhash P. Acharya, MD, FACC[8]
Craig M. Coopersmith, MD, MCCM[9]
Shevin T. Jacob, MD, MPH[10,11]
Cintia Johnston, PhD[12]
Niranjan Kissoon, MBBS, MCCM, FRCP(C), FACPE[13]
Flávia R. Machado, MD, PhD[14]
Elizabeth Molyneux, MBBS, FRCP, FRCPCH, FCEM, DSc h.c., OBE[15]
Brenda M. Morrow, PhD[16]
Martha Susana Pérez Cornejo, MD, FCCM[17]
Chairat Permpikul, MD[18]
Kunchit Piyavechviratana, MD[19]
Andrew Rhodes, MBBS, MD(Res), FRCA, FFICM, FRCP[20]
Mpoki M. Ulisubisya, MD, MMed, FCA(ECSA)[21]
Vishakha K. Kumar, MD, MBA[22]
Hariyali Patel, MHA[22]
Daniel Woznica, PhD[22]
Vinay M. Nadkarni, MD, MS, FCCM[23]

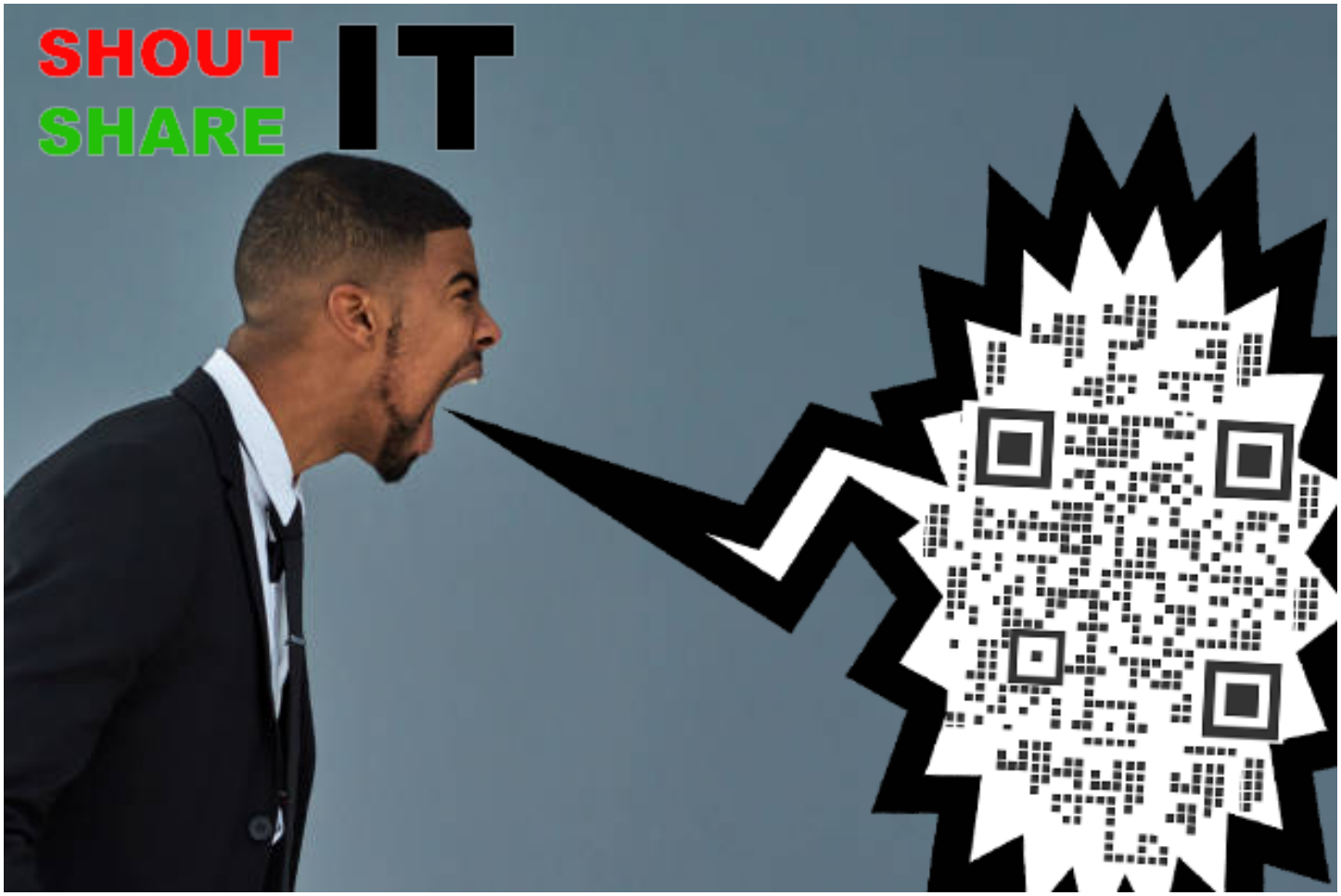
Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

DOI: 10.1097/CCM.0000000000007090

Sepsis is a dysregulated immune response to infection that can induce life-threatening organ dysfunction (1). Sepsis accounts for one in five deaths worldwide, with an estimated 49 million cases annually (2), and 85% of both sepsis cases and deaths occur in low-resource settings (LRSs) (2). Integrated management across the sepsis Chain of Survival (3) (**Fig. 1**) is therefore essential: awareness and prevention; early recognition and call for help; continuous source control; appropriate fluids, oxygen, and antibiotics; critical care without walls; and post-sepsis care.

Building on successful ten-step frameworks for high-quality resuscitation for out-of-hospital (4) and in-facility adult (5), pediatric (6), and neonatal

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.


SHOUT
SHARE
IT

KEY POINTS

Question: Can a consensus-based framework be developed that provides practical, actionable guidance to improve sepsis care across the continuum of care in low-resource settings?

Findings: An international, multidisciplinary Task Force used a rigorous consensus process to develop ten nonsequential, adaptable steps addressing governance, education, prevention, early recognition, timely guideline-based management, post-sepsis care, data systems, quality improvement, and workforce and patient well-being.

Meaning: This framework offers a pragmatic roadmap for clinicians, health system leaders, and policymakers to strengthen the sepsis chain of survival, improve quality of care, and reduce preventable sepsis morbidity and mortality in low-resource settings.

cardiac arrest (7), the Utstein Formula for Survival (8)—Medical Science, Educational Efficiency, and Local Implementation (9)—has been adapted to sepsis. However, this step-by-step approach to implement the Surviving Sepsis Campaign guidelines (10) was not specifically applicable to LRS. In response, the Society of Critical Care Medicine (SCCM) convened a global Task Force to develop consensus guidance that reflects current evidence, leverages international expertise, and promotes optimal care worldwide.

The ten steps aim to improve recognition, timely response, local implementation, quality of care, and outcomes across the Chain of Survival (3), particularly in LRS. They apply to communities, emergency responders, healthcare facilities, and systems, helping to identify gaps and prioritize interventions according to local needs. "The steps are neither sequential nor prescriptive but are adaptable to context." Central to the ten steps is the interdisciplinary team's role to prevent, recognize, manage, and monitor outcomes, while promoting awareness across the continuum of care (**Fig. 2**). Importantly, the ten-step approach aligns with the World Health Organization's (WHO) resolutions on Integrated Emergency, Critical, and Operative Care (11, 12) and the Acute Care Action Network (ACAN) (13). These ten steps were designed to be actionable, synergistic, and applicable across resource-variable settings.

METHODOLOGY

A SCCM committee formed a Task Force of global sepsis leaders, appointed for their clinical, public health, and/or research experience in low-, middle-, and high-resource settings with attention to conflicts of interest (**Supplemental Table 1**, https://links.lww.com/CCM/H916). To guide the discussion and development of the ten steps to improving care in LRS, the Task Force defined sepsis as a "life-threatening organ dysfunction caused by a dysregulated host response to infection" (1) and conceptualized sepsis management along the "Chain of Survival" framework (3) (Fig. 1). Both community- or facility-acquired sepsis require early recognition and time-critical interventions and were, therefore, considered (14).

A four-part, iterative, consensus-based process was used: 1) literature review, 2) Delphi survey, 3) Utstein-style conference (15), and 4) public comment. The methods and findings from the literature review and Delphi survey are detailed in a separate publication. During an 8-month virtual preparatory phase

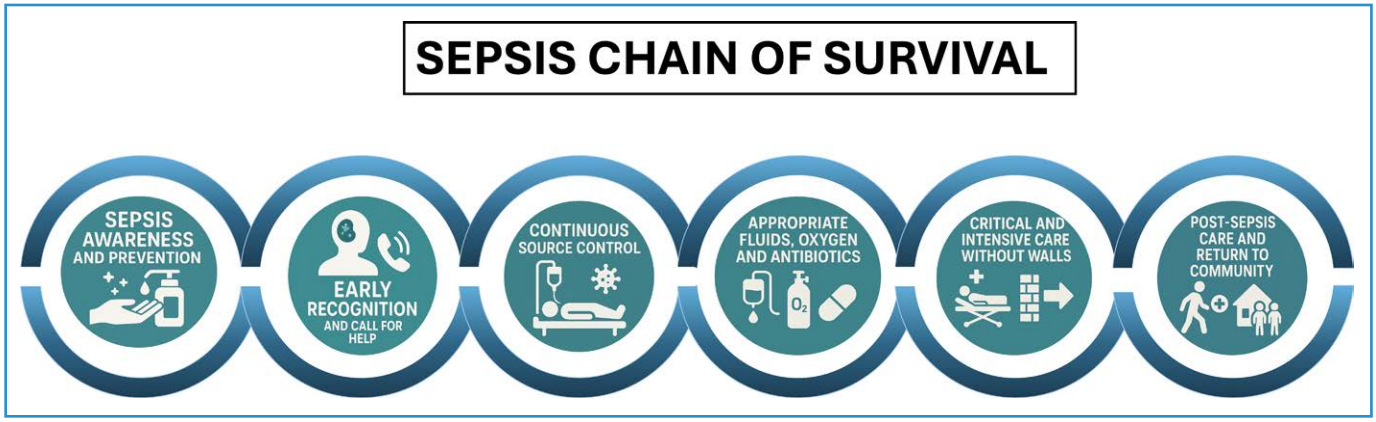

SEPSIS CHAIN OF SURVIVAL
SEPSIS AWARENESS AND PREVENTION
EARLY RECOGNITION AND CALL FOR HELP
CONTINUOUS SOURCE CONTROL
APPROPRIATE FLUIDS, OXYGEN AND ANTIBIOTICS
CRITICAL AND INTENSIVE CARE WITHOUT WALLS
POST-SEPSIS CARE AND RETURN TO COMMUNITY

Figure 1. Sepsis chain of survival.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

(2024), candidate measures were refined using prior ten steps documents as templates (4–7). An in-person Utstein-style meeting (October 13–14, 2024, Vaud, Switzerland) (15) began with a review of literature findings and candidate "steps." Concepts with greater than 80% agreement were advanced. In rotating small groups, members discussed draft steps, with moderators summarizing, refining, aligning, and resolving differences in content across sessions (**Supplemental Fig. 1**, https://links.lww.com/CCM/H916). A plenary session confirmed consensus (> 80% agreement), followed by a second rotation session to identify implementation strategies. The draft ten steps were then shared with the Task Force, SCCM and Surviving Sepsis Campaign leadership, and representatives from WHO and ACAN at the Geneva 2024 meeting to solicit feedback. Afterward, a 14-day public comment period invited feedback from global stakeholders and the public (**Supplemental Tables 2** and **3**, https://links.lww.com/CCM/H916) (7). The SCCM Discovery Council reviewed and approved the ten steps (**Table 1**) before submission. Supporting evidence and additional discussion for the implementation strategies are available in **Appendix 1** (https://links.lww.com/CCM/H916) and a reducing mortality from sepsis in LRS toolkit is available online (sccm.org/sepsis-10-steps).

TEN STEPS TO IMPROVE SEPSIS CARE IN LOW-RESOURCE SETTINGS

PREPARE

Step—Governance, Health Commodities, and Products

Action: Ensure health system readiness to manage sepsis, inclusive of adequate supplies and infrastructure.

Rationale: Effective sepsis care depends on infrastructure, access to essential commodities, and sustained financing; robust governance, national and local leadership, and strategic planning are required to overcome resource constraints (16, 17). Governments and facilities should integrate sepsis care commodities and products into national and facility essential medicine lists and procurement plans, use incentives to reduce costs, and implement long-term budgets covering equipment, personnel, and infrastructure. Supply chain and inventory management tools, contracts with reliable suppliers and local distributors, and direct engagement with manufacturers can reduce stockouts,

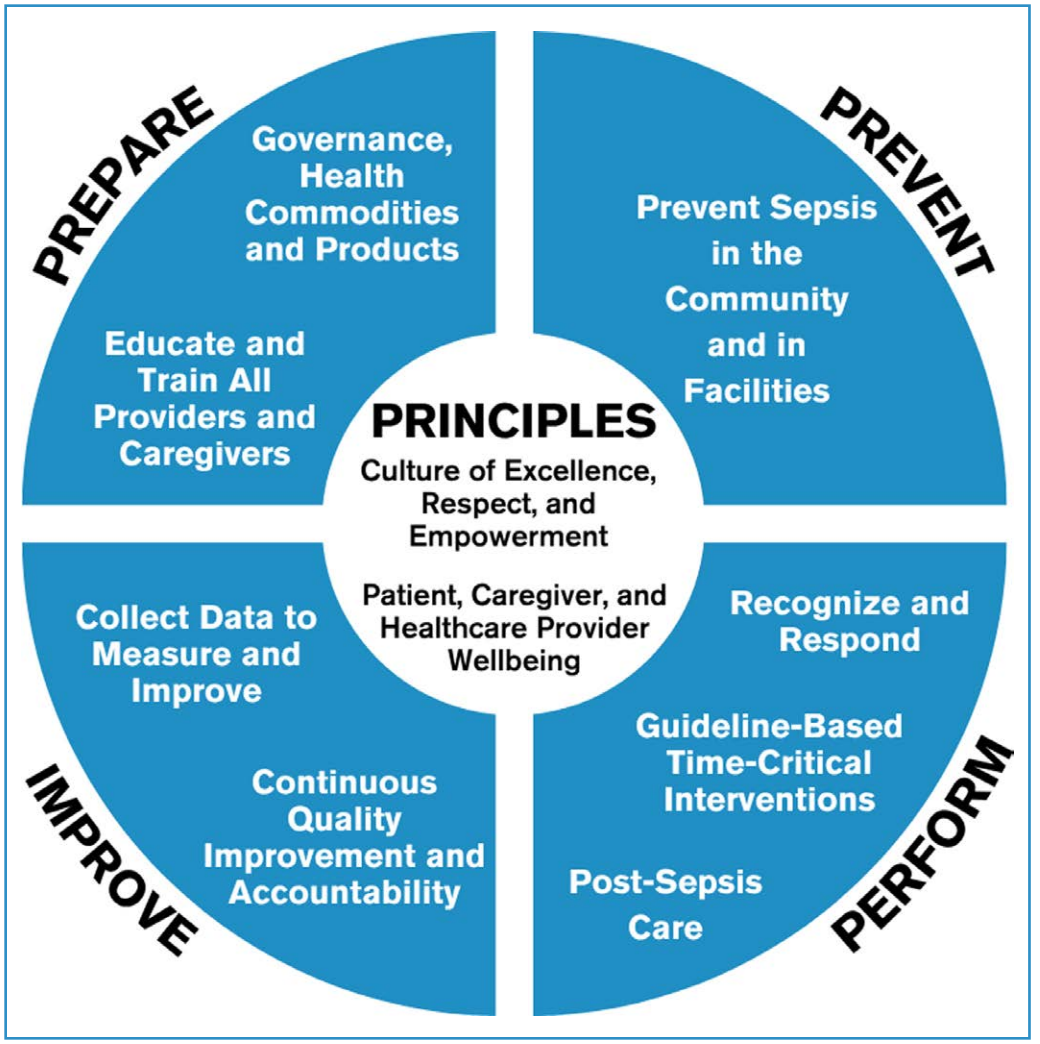


Figure 2. The ten steps toward improving sepsis quality of care and outcomes in low-resource settings as a cycle of continuous improvement.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

TABLE 1.
Summary of the Ten Steps Toward Improving Sepsis Quality of Care and Outcomes in Low-Resource Settings, Actions, and Implementation Strategies

Domain	Step	Summary Concepts
Prepare	Governance, health commodities and products	Ensure reliable access to essential sepsis care commodities, infrastructure, and functional equipment through strategic procurement, inventory management, and sustainable financing at system and facility levels.
	Educate and train all providers and caregivers	Implement continuous, competency-based sepsis education for healthcare providers and communities, using blended learning approaches, skill assessments, and awareness campaigns to promote early recognition and management.
Prevent	Prevent sepsis in the community and in facilities	Promote public health interventions, infection prevention, vaccination, hygiene, and awareness to reduce community- and facility-acquired sepsis.
		Leverage surveillance systems to detect and respond to infection risks.
Perform	Recognize and respond	Train providers and caregivers to identify sepsis danger signs and activate emergency response pathways.
		Establish triage, referral, and transport systems supported by decision tools and clear escalation protocols.
	Guideline-based time-critical interventions	Implement context-adapted sepsis bundles and protocols to ensure timely delivery of antibiotics, fluids, oxygen, and source control.
		Use cognitive aids, decision-support systems, and telemedicine to enhance adherence.
	Post-sepsis care	Develop structured post-sepsis care plans including risk stratification, follow-up, rehabilitation, and community-based support to address long-term sequelae and prevent recurrence.
		Leverage remote monitoring when feasible.
Improve	Collect data to measure and improve	Establish sepsis registries and data systems to track key metrics, processes, and outcomes.
		Use standardized data collection tools, integrate with existing systems, and provide actionable care improvement feedback.
	Continuous quality improvement and accountability	Conduct regular audits, track performance indicators, and foster a culture of continuous improvement through interdisciplinary quality improvement initiatives, feedback loops, collaborative networks, and real-time dashboards.
Principles	Culture of excellence, respect and empowerment	Promote teamwork, patient-centered care, cultural competence, and psychological safety.
		Support leadership, mentorship, and respectful communication to foster excellence across sepsis care.
	Patient, caregiver, and healthcare provider well-being	Support the holistic well-being of patients, caregivers, and providers through mental health services, structured communication, support groups, and resilience programs.
		Utilize telehealth to extend care and counseling.

minimize shortages, and improve efficiency. Authorities should be vigilant to uphold standards, reinforce accountability, and ensure sustainable access to life-saving interventions throughout the health system while facilitating the collection and analysis of data. At the bedside, preparedness requires equipment availability, proper storage and maintenance, and quality-assurance measures, supported by training and collaboration between providers, engineers, and biomedical technicians (14, 16–19). These actions strengthen readiness and ensure patients receive time-critical, potentially life-saving interventions without delay.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

Implementation Strategies

- Include essential sepsis care commodities and products in the national essential medicine list and procurement plans.
- Leverage tax waivers and other economic incentives to mitigate supply costs.
- Develop a feasible, longitudinal budget at the national and local levels that includes infrastructure, personnel, and equipment to deliver high-quality sepsis care.
- Directly access supply chains and contracts with local manufacturers/distributors to ensure the availability of sepsis care equipment.
- Use supply chain and inventory management software or mobile apps to track supply levels.
- Ensure the infrastructure and capacity to maintain and store equipment.
- Implement job aids for equipment use, maintenance, and storage.
- Establish quality-assurance procedures with regular assessments to ensure equipment functionality.

PREPARE

Step—Educate and Train All Providers and Caregivers

Action: Implement comprehensive training programs for healthcare providers, caregivers, and families to ensure sepsis prevention, early recognition, and management.

Rationale: Comprehensive education for providers across the continuum of care (e.g., village, health workers, community health workers, first responders, traditional healers, midwives, nurses, clinicians, etc.) is paramount to effectively reduce sepsis-related mortality and morbidity (20–23). This involves not only training the providers on clinical skills but also increasing awareness at the caregiver and community level to empower early identification and intervention. For healthcare providers, sepsis competencies should be embedded into core curricula and reinforced through blended learning (e.g., virtual and face-to-face) and skills-based approaches that maximize simulation- and team-based training (24). Ongoing refresher methods, such as low-dose high-frequency training, just-in-time coaching, and peer feedback, maintain skills over time. Train-the-trainer models and community awareness campaigns expand the reach of education, equipping healthcare providers, caregivers, patients, and families with the knowledge to recognize and respond to sepsis "danger signs" promptly (25). These approaches, including a focus on "danger signs" that reflect infection-related organ dysfunction and severity of illness rather than a specific definition of sepsis, build a knowledgeable, confident workforce prepared to deliver timely, high-quality sepsis care (25).

Implementation Strategies

- Ensure skills-based training and embed sepsis management competencies into the education and postgraduate training curricula of healthcare professionals.
- Implement blended instruction and multimodal learning approaches tailored to individual and local needs.
- Evaluate skill performance with standardized checklists.
- Maintain skills with continuous low-dose, high-frequency, and just-in-time training.
- Create opportunities for sepsis clinical case discussions.
- Promote skilled personnel retention with a rewards and recognition system.
- Promote community awareness of sepsis prevention, highlighting "danger signs" (25), and encouraging emergency system activation.

PREVENT

Step—Prevent Sepsis in the Community and in Facilities

Action: Promote awareness to prevent community-acquired sepsis using public health interventions. Prevent facility-acquired sepsis with implementation of strong infection prevention and control (IPC) practices.

Rationale: Preventing sepsis depends on robust public-health measures in the community and evidence-based IPC measures in facilities; these reduce infections and, consequently, sepsis incidence. Strategies include vaccination, good nutrition, exclusive breastfeeding, clean water and sanitation, and regular antenatal care, especially for high-risk groups. Sepsis requires timely recognition and treatment to achieve early intervention, source control, and optimal outcomes (1). Awareness campaigns can help communities recognize early symptoms and seek care promptly, while health facilities should reinforce hand hygiene, implement IPC programs, and manage infections early to prevent progression to sepsis. Surveillance systems, including emerging technologies, can support outbreak detection and track antimicrobial resistance.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

Implementation Strategies

- Increase sepsis awareness for both communities and healthcare providers.
- Provide universally accessible preventive care and public health essentials, including the promotion of proper nutrition; clean water supply, sanitation, and hygiene; and vaccinations.
- Promote healthy practices in the community.
- Strengthen IPC practices in healthcare facilities.
- Incorporate data-driven surveillance and response systems.

PERFORM

Step—Recognize and Respond

Action: Develop systems for early recognition of "danger signs" (25) linked to rapid response for initial sepsis interventions in communities and facilities.
Rationale: Early recognition of WHO sepsis "danger signs" (25) and rapid response are essential to reduce mortality (26). Training frontline workers, patients, caregivers, and families to identify WHO-defined sepsis signs and initiate emergency response pathways can ensure timely interventions. The development of inter-facility referral pathways and medical transport systems is necessary for timely access to emergency, critical, and operative care. Facilities should implement standardized triage systems with escalation protocols to ensure timely access to the appropriate care level. Bedside clinical assessment remains critical, supported where feasible by laboratory tests and digital tools such as mobile alerts and decision-support systems (27, 28). These strategies enable earlier detection, appropriate differentiation from other critical conditions, and faster initiation of life-saving care.

Implementation Strategies

- Educate and train patients, caregivers, families, village and community healthcare workers, and clinicians to identify WHO sepsis "danger signs" (25) and initiate emergency response pathways.
- Implement triage systems and develop clear inter-facility referral pathways, supported by medical transport, to ensure timely access to operative and critical care when needed.
- Establish medical transport and emergency response systems, including rural and remote regions.
- Establish standardized protocols and escalation pathways within the facility.
- Implement sepsis identification and decision-support tools, including technology-enhanced tools.

PERFORM

Step—Guideline-Based Time-Critical Interventions

Action: Ensure the timely implementation of an appropriate, contextualized sepsis bundle.
Rationale: Sepsis is a syndrome that requires time-critical intervention; the timely implementation of a sepsis care bundle is essential to improving patient outcomes (29–35). Standardized protocols adapted to local context and epidemiology ensure consistency in care (30, 36) and include monitoring, microbiology/rapid tests, empiric antimicrobial therapy, organ support, and timely source control. Embedding contextualized, guideline-based approaches into routine clinical practice strengthens response systems, reduces unwarranted variability, and improves outcomes, particularly in LRS (30, 36, 37). Facilities should ensure access to sepsis diagnostics and essential medications, as well as ensure that sepsis protocols are available, used, and supported by staff training (20, 30, 38, 39). Simulation, team-based training and telemedicine can provide support for community providers. Clinical algorithms, decision-support tools, checklists, and emerging technologies can help clinicians prioritize and execute interventions quickly and consistently, reducing delays and variability in care (38, 39).

Implementation Strategies

- Ensure the availability and implementation of context-relevant sepsis guidelines and care bundles.
- Ensure interdisciplinary team sepsis training.
- Leverage telemedicine and virtual technology to support community providers.
- Use management algorithms and cognitive aids (physical or mobile app-based) displayed where sepsis care is delivered.
- Deploy and leverage decision-support systems informed by contextualized sepsis guidelines, including the use of emerging technologies, where appropriate.

PERFORM

Step—Post-Sepsis Care

Action: Establish a holistic pathway for post-sepsis care, including monitoring for organ dysfunction, rehabilitation, long-term sequelae prevention and management, and follow-up care to support recovery and prevent recurrence.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

Rationale: Patients recovering from sepsis require structured follow-up to prevent recurrence and manage long-term physical, neurocognitive, and psychoemotional sequelae, which can lead to decreased quality of life if not detected and managed in a timely manner (40). Risk stratification and individualized discharge plans should be established before leaving the facility, with clear communication to patients, caregivers, families, and primary providers. Community- and home-based rehabilitation programs, telemedicine support, and remote monitoring tools can extend care beyond facilities and may be particularly beneficial in settings with primary care provider shortages (27, 41). Educating patients, caregivers, and families about the signs of recurrence and available resources enhances recovery and prevents complications. Coordinated post-sepsis pathways promote sustained recovery and reduce the burden of long-term disability (40).

Implementation Strategies

- Risk-stratify and identify the optimal post-sepsis care plan.
- Develop and communicate a coordinated short- and long-term post-sepsis follow-up plan.
- Educate and support the primary care providers/caregivers in the community to facilitate the transition of care.
- Establish community and home-based rehabilitation and support programs.
- Leverage remote surveillance/monitoring and rescue/response tools when available.

IMPROVE

Step—Collect Data to Measure and Improve

Action: Establish sepsis registries that collect and display actionable data, pertinent across resource-variable settings, throughout the continuum of care and include key performance indicators and outcome metrics, while considering the needs of local, regional, national, and international systems of care.

Rationale: Systematic data collection and analysis are critical to track sepsis outcomes and drive improvement. Sepsis registries should include variables with standardized definitions and capture actionable metrics such as mortality, time to sepsis recognition, time to key interventions (e.g., oxygen, antibiotics, fluid administration, source control), and linkage to follow-up care, as well as variables that contribute to morbidity and mortality, such as disease etiology, severity of illness, and risk factors. Where feasible, integrating sepsis metrics and data capture into existing health information systems, such as electronic health record (EHR) systems and the WHO District Health Information System-2, reduces duplication and documentation burden. Routine feedback to clinicians and facilities on key indicators via dashboards can enable the identification of gaps, inform training needs, identify systems issues that require higher-level support, track outcomes in response to improvements and system-level changes, and promote accountability. Leveraging EHRs, mobile data tools, and emerging technologies can streamline data collection, improve accuracy, and ensure that data are actionable to support decision-making at all levels (27, 42, 43).

Implementation Strategies

- Establish sepsis registries to track critical, actionable metrics.
- Develop and disseminate core data elements for sepsis care and outcomes.
- Generate data-informed estimates of sepsis incidence to better understand and monitor the impact of pre-facility interventions.
- Consider intermittent data collection approaches to reduce the burden of data collection.
- Provide regular feedback to identify gaps, inform training, and drive improvement.
- Implement efficient EHR systems that facilitate data capture.
- Integrate tools to improve data accuracy, support decision-making, and increase reporting, inclusive of emerging technologies, when appropriate.

IMPROVE

Step—Continuous Quality Improvement and Accountability

Action: Establish regular team-based interdisciplinary audits to measure the sepsis process of care and outcomes, identify modifiable factors, and analyze data for decision-making.

Rationale: Continuous quality improvement (QI) efforts to evaluate care processes and outcomes can be implemented utilizing patient data at the individual, unit, facility, health system, regional, and national levels. Facilities should provide interdisciplinary QI team training, establish QI committees, conduct regular audits, and implement team-based reviews using structured

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

approaches, such as the Scan-Teach-Treat program and Plan-Do-Study-Act cycles (44, 45). QI efforts can be viewed as an iterative process, with facilitators, barriers, success, and failure stories identified and shared with attention to maintain patient confidentiality. Real-time dashboards and feedback loops track performance on key indicators (e.g., time to antibiotics) and identify bottlenecks while recognition systems foster accountability and motivation among staff. Collaborative networks and innovation in implementation research further refine best practices and strengthen a culture of continuous improvement in sepsis care.

Implementation Strategies

- Track key performance metrics in real-time and provide actionable feedback.
- Use dashboards to display performance metrics.
- Conduct regular audits of sepsis care quality to track progress and drive continuous improvement.
- Establish local QI committees and encourage locally relevant project development.
- Incorporate interdisciplinary QI team training (e.g., link learning management with performance and outcome systems to create a learning healthcare system).
- Perform sepsis case reviews to identify opportunities for improvement and potential bottlenecks to care.
- Highlight the high performance and best practices of individuals and teams.
- Develop collaborative QI networks and communities of practice.
- Refine best practices and improve equipment through innovation and implementation research.
- Link data to vital outcomes and disease surveillance systems.

PRINCIPLE

Step—Culture of Excellence, Respect, and Empowerment

Action: Foster a culture of excellence, respect, and empowerment for healthcare teams, patients, caregivers, and families, ensuring optimal sepsis management through clear communication, teamwork, and patient-centered care.
Rationale: A culture of excellence requires respectful communication, teamwork, collaboration, and shared decision-making. Patient- and family-centered care ensures alignment with cultural values and goals. Leadership should foster mentorship, professional development, and accountability to sustain high standards. Digital platforms can support communication and documentation. Embedding excellence and respect into daily practice enables effective, patient-centered sepsis care.

Implementation Strategies

- Promote culturally sensitive, transparent communication and shared decision-making.
- Respect all cultural, religious, and spiritual backgrounds.
- Support continuous professional development and leadership.
- Promote mentorship and role modeling.
- Engage and respect multidisciplinary teams.
- Provide cultural competence training for providers.
- Use digital platforms for coordinated communication and documentation.

PRINCIPLE

Step—Patient, Caregiver, and Healthcare Provider Well-being

Action: Support patients, caregivers, families, and healthcare providers during and after sepsis care.
Rationale: Promoting well-being for patients, caregivers, families, and providers strengthens recovery and preserves a resilient workforce. Comprehensive support (e.g., counseling, support groups, bereavement care, spiritual services) reduces post-sepsis complications. Telemedicine and remote tools improve access. Workforce well-being depends on adequate staffing, fair compensation, mentorship, and psychologic support to prevent burnout. Prioritizing holistic well-being ensures stronger recovery for patients and a sustainable healthcare workforce.

Implementation Strategies

- Identify the needs and concerns of the caregiver and patient, and engage spiritual, psychological, and religious officials to support well-being.
- Ensure patient, caregiver, and family access to support groups and bereavement counseling.
- Form patient advisory councils and use the council's feedback to improve the patient, caregiver, and family experience.
- Use language interpreters when appropriate.
- Ensure that providers have access to psychologic support.
- Foster healthcare worker well-being.

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

- Collect anonymized feedback from patients, caregivers, families, staff, and providers, and use it to inform positive change.
- Implement telemedicine platforms for follow-up care and counseling.

CONCLUSIONS

The ten steps to Improve Sepsis Care and Outcomes, inclusive of LRS, is a pragmatic approach for key stakeholders, including healthcare leaders, health ministries, and healthcare facility administrators to identify current strengths and existing gaps in sepsis care. These steps, actions, and implementation strategies were identified as part of a multidisciplinary team consensus of global experts from diverse settings and are intended to strengthen the Sepsis Chain and Frame of Survival (3), improve the quality of sepsis care, and decrease morbidity and mortality due to sepsis, particularly in LRS. Health disparities persist on a global scale, however, and there remain significant knowledge gaps in sepsis management, especially in LRS; more research is needed, as well as dedicated resources for education and global awareness. Additionally, it is crucial to work at the policy level in coordination with the WHO, ACAN, national ministries of health, and other global and local organizations, while supporting Universal Health Coverage efforts and country-specific strategic plans, to ensure that these efforts are sustainable, appropriately prioritized, and contextually relevant. In conclusion, the ten steps are a feasible, innovative approach to improve the quality of sepsis care, sepsis-related outcomes, and global disparities.

ACKNOWLEDGMENTS

We thank Dr. Lee Wallis and Dr. Emilie Calvello from the World Health Organization for their input and contributions and Tore and Ingrid Laerdal for their support in the elaboration of this report.

1 *Department of Pediatrics, Critical Care Medicine, University of California San Francisco, San Francisco, CA.*

2 *Institute for Global Health Sciences, University of California San Francisco, San Francisco, CA.*

3 *Division of Critical Care and COVID-19-Unit, Belize Healthcare Partners Limited, Belize.*

4 *Kenya Medical Research Institute-Wellcome Trust Research Program (KWTRP), Nairobi, Kenya.*

5 *Department of Anesthesiology, Critical Care and Pain, Tata Memorial Hospital, Homi Bhabha National Institute, Mumbai, India.*

6 *Sections of Infectious Diseases and Critical Care Medicine, Wake Forest University School of Medicine, Winston-Salem, NC.*

7 *Critical Care Services, Baptist Hospital of Miami, Miami, FL.*

8 *Maharajgunj Medical Campus at Institute of Medicine, Tribhuvan University Teaching Hospital, Tribhuvan University, Kathmandu, Nepal.*

9 *Department of Surgery and Emory Critical Care Center, Emory School of Medicine, Atlanta, GA.*

10 *Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, United Kingdom.*

11 *Walimu, Kampala, Uganda.*

12 *Department of Pediatrics, Faculty of Medicine, University of São Paulo (FMUSP), São Paulo, Brazil.*

13 *Department of Pediatrics, British Columbia Children's Hospital, Vancouver, BC, Canada.*

14 *Intensive Care Department, Hospital Universitário/Hospital São Paulo, Escola Paulista de Medcina, Federal University of São Paolo, São Paulo, Brazil.*

15 *Kamuzu University of Health Sciences, Blantyre, Malawi.*

16 *Department of Pediatrics and Child Health, University of Cape Town, Cape Town, South Africa.*

17 *Division of Critical Care, State General Hospital, Hermosillo, Sonora, Mexico.*

18 *Division of Critical Care, Department of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand.*

19 *Division of Pulmonary and Critical Care Medicine, Phramongkutklao Hospital, Bangkok, Thailand.*

20 *Adult Critical Care, St George's University Hospitals NHS Foundation Trust & City St George's, University of London, London, United Kingdom.*

21 *Muhimbili Orthopaedic Institute, Dar es Salaam, Tanzania.*

22 *Department of Research and Quality, Society of Critical Care Medicine, Mount Prospect, IL.*

23 *Department of Anesthesiology, Critical Care and Pediatrics, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA.*

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (http://journals.lww.com/ccmjournal).

Supported by grant from the Laerdal Foundation.

Dr. Coopersmith's laboratory is funded by the National Institutes of Health (NIH); he is the current co-chair of the Surviving Sepsis Campaign Steering Committee. Dr. Hidalgo is the current president of the World Federation of Intensive and Critical Care (WFICC). Dr. Jacob received sepsis research grant funding from the German Federal Ministry of Research, Technology, and Space, the U.K. National Institute for Health and Care Research, and the U.K. Medical Research Council; he is the Board and Executive Member for the Global Sepsis Alliance and for the African Sepsis Alliance; and he is the Member of the Surviving Sepsis

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

Campaign guidelines committee. Dr. Machado is the speaker for Baxter, and the relationship is now ended. Dr. Maves received research funding to my institution from AiCuris, Biotest, Geovax, and Merck; he is consulted for Shionogi and GSK; and he is the member of the Surviving Sepsis Campaign guidelines committee. Dr. Myatra is the member of the Surviving Sepsis Campaign guidelines committee; she is a member of the Asia Pacific Sepsis Alliance. Dr. Pérez Cornejo is the speaker of Pfizer; she is the current president of the Mexican College of Critical Medicine. Dr. Perez-Fernandez is the speaker for AstraZeneca and the President-Elect of the WFICC. Dr. Piyavechviratana is the current president of the Thai Society of Critical Care Medicine. Dr. Kortz is supported by the National Institute of Allergy and Infectious Diseases (award number K23AI144029). Dr. Kumar received research grant funding from the Laerdal Foundation and the NIH/National Heart, Lung, and Blood Institute for my institution. Dr. Nadkarni received research grant funding for my institution from the NIH, the Department of Defense, the Agency for Healthcare Quality and Safety, the Zoll Medical, the Laerdal Foundation, and the American Heart Association. The remaining authors have disclosed that they do not have any potential conflicts of interest.

For information regarding this article, E-mail: teresa.kortz@ucsf.edu

REFERENCES

1. Singer M, Deutschman CS, Seymour CW, et al: The third international consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA* 2016; 315:801–810
2. Rudd KE, Johnson SC, Agesa KM, et al: Global, regional, and national sepsis incidence and mortality, 1990-2017: Analysis for the Global Burden of Disease Study. *Lancet* 2020; 395:200–211
3. Hidalgo JL, Kumar VK, Akech SO, et al: The sepsis chain of survival: A comprehensive framework for improving sepsis outcomes. *Crit Care Med* 2025; 53:e1886–e1892
4. Resuscitation Academy: 10 Steps for Improving Survival From Cardiac Arrest. 2020. Available at: https://globalresuscitationalliance.org/downloads/ebook/10_steps_2019.pdf. Accessed April 25, 2025
5. Chan PS, Greif R, Anderson T, et al; International Liaison Committee on Resuscitation: Ten steps toward improving in-hospital cardiac arrest quality of care and outcomes. *Resuscitation* 2023; 193:109996
6. Jung P, Brenner S, Bachmann I, et al: More than 500 kids could be saved each year! Ten consensus actions to improve quality of pediatric resuscitation in DACH-countries (Austria, Germany, and Switzerland). *Front Pediatr* 2020; 8:549710
7. Foglia EE, Rettedal S, Nadkarni V, et al: Ten steps to improve outcomes of in-facility neonatal resuscitation. *Resuscitation* 2025; 217:110746
8. Søreide E, Morrison L, Hillman K, et al; Utstein Formula for Survival Collaborators: The formula for survival in resuscitation. *Resuscitation* 2013; 84:1487–1493
9. Chamberlain DA, Hazinski MF; European Resuscitation Council: Education in resuscitation. *Resuscitation* 2003; 59:11–43
10. Gao Y, Wang HL, Zhang ZJ, et al: A standardized step-by-step approach for the diagnosis and treatment of sepsis. *J Intensive Care Med* 2022; 37:1281–1287
11. World Health Organization: Integrated emergency, critical and operative care for universal health coverage and protection from health emergencies. Executive Board 152nd Session; January 30, 2023, to February 7, 2023; Geneva, Switzerland
12. Tadesse L, Abdullah NH, Awadalla HMI, et al: A global mandate to strengthen emergency, critical and operative care. *Bull World Health Organ* 2023; 101:231–231A
13. World Health Organization: WHO Announces Acute Care Action Network for Emergency, Critical and Operative Care. 2023. Available at: https://www.who.int/news/item/31-05-2023-who-announces-acute-care-action-network-for-emergency-critical-and-operative-care. Accessed October 11, 2023
14. Alsadoon A, Alhamwah M, Alomar B, et al: Association of antibiotics administration timing with mortality in children with sepsis in a tertiary care hospital of a developing country. *Front Pediatr* 2020; 8:566
15. Cummins RO, Chamberlain DA, Abramson NS, et al: Recommended guidelines for uniform reporting of data from out-of-hospital cardiac arrest: The Utstein Style. Task Force of the American Heart Association, the European Resuscitation Council, the Heart and Stroke Foundation of Canada, and the Australian Resuscitation Council. *Ann Emerg Med* 1991; 20:861–874
16. Abdu M, Wilson A, Mhango C, et al: Resource availability for the management of maternal sepsis in Malawi, other low-income countries, and lower-middle-income countries. *Int J Gynaecol Obstet* 2018; 140:175–183
17. Aiken AM, Nyamwaya B, Madrid L, et al; MBIRA study collaborators: Circumstances for treatment and control of invasive Enterobacterales infections in eight hospitals across sub-Saharan Africa: A cross-sectional study. *Gates Open Res* 2023; 7:21
18. Baelani I, Jochberger S, Laimer T, et al: Availability of critical care resources to treat patients with severe sepsis or septic shock in Africa: A self-reported, continent-wide survey of anaesthesia providers. *Crit Care* 2011; 15:R10
19. Oliveira CF, Nogueira de Sá FR, Oliveira DS, et al: Time- and fluid-sensitive resuscitation for hemodynamic support of children in septic shock: Barriers to the implementation of the American College of Critical Care Medicine/Pediatric Advanced Life Support Guidelines in a pediatric intensive care unit in a developing world. *Pediatr Emerg Care* 2008; 24:810–815
20. Apibunyopas Y: Mortality rate among patients with septic shock after implementation of 6-hour sepsis protocol in the emergency department of Thammasat University Hospital. *J Med Assoc Thai* 2014; 97(Suppl 8):S182–S193
21. Adegbite BR, Edoa JR, Rylance J, et al: Knowledge of health workers relating to sepsis awareness and management in Lambaréné, Gabon. *Acta Trop* 2021; 219:105914
22. Assunção M, Akamine N, Cardoso GS, et al; SEPSES Study Group: Survey on physicians' knowledge of sepsis: Do they recognize it promptly? *J Crit Care* 2010; 25:545–552
23. Mesiwala A, Suleman S, Sundararajan R, et al: Recognition and management of pediatric sepsis in a resource-limited emergency department in Mwanza, Tanzania: A qualitative study. *Pediatr Emerg Care* 2022; 38:e900–e905
24. James EJG, Vyasam S, Venkatachalam S, et al: Low-cost "telesimulation" training improves real patient pediatric shock outcomes in India. *Front Pediatr* 2022; 10:904846

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.

25. World Health Organization: Pocket Book of Hospital Care for Children: Guidelines for the Management of Common Illnesses With Limited Resources. 2013. Available at: https://www.who.int/publications/i/item/978-92-4-154837-3 Accessed January 28, 2025
26. Asiimwe SB, Abdallah A, Ssekitoleko R: A simple prognostic index based on admission vital signs data among patients with sepsis in a resource-limited setting. *Crit Care* 2015; 19:86
27. Ghiasi S, Zhu T, Lu P, et al: Sepsis mortality prediction using wearable monitoring in low-middle income countries. *Sensors (Basel)* 2022; 22:3866
28. Tan R, Kavishe G, Luwanda LB, et al: A digital health algorithm to guide antibiotic prescription in pediatric outpatient care: A cluster randomized controlled trial. *Nat Med* 2024; 30:76–84
29. Ahmed SI, Rind GK, Sikandar R, et al: Early recognition and management of maternal sepsis in Pakistan: A feasibility study of the implementation of FAST-M intervention. *BMJ Open* 2023; 13:e069135
30. Jacob ST, Banura P, Baeten JM, et al; Promoting Resource-Limited Interventions for Sepsis Management in Uganda (PRISM-U) Study Group: The impact of early monitored management on survival in hospitalized adult Ugandan patients with severe sepsis: A prospective intervention study. *Crit Care Med* 2012; 40:2050–2058
31. Levy MM, Rhodes A, Phillips GS, et al: Surviving sepsis campaign: Association between performance metrics and outcomes in a 7.5-year study. *Intensive Care Med* 2014; 40:1623–1633
32. Medeiros DNM, Mafra ACCN, Carcillo JA, et al: A pediatric sepsis protocol reduced mortality and dysfunctions in a Brazilian public hospital. *Front Pediatr* 2021; 9:757721
33. Rodrigues-Santos G, de Magalhães-Barbosa MC, Raymundo CE, et al: Improvement of 1st-hour bundle compliance and sepsis mortality in pediatrics after the implementation of the surviving sepsis campaign guidelines. *J Pediatr (Rio J)* 2021; 97:459–467
34. Samransamruajkit R, Limprayoon K, Lertbunrian R, et al: The utilization of the surviving sepsis campaign care bundles in the treatment of pediatric patients with severe sepsis or septic shock in a resource-limited environment: A prospective multicenter trial. *Indian J Crit Care Med* 2018; 22:846–851
35. Wang Z, Xiong Y, Schorr C, et al: Impact of sepsis bundle strategy on outcomes of patients suffering from severe sepsis and septic shock in China. *J Emerg Med* 2013; 44:735–741
36. Kortz TB, Axelrod DM, Chisti MJ, et al: Clinical outcomes and mortality before and after implementation of a pediatric sepsis protocol in a limited resource setting: A retrospective cohort study in Bangladesh. *PLoS One* 2017; 12:e0181160
37. Andrews B, Semler MW, Muchemwa L, et al: Effect of an early resuscitation protocol on in-hospital mortality among adults with sepsis and hypotension: A randomized clinical trial. *JAMA* 2017; 318:1233–1240
38. Kovacevic P, Jandric M, Kovacevic T, et al: Impact of checklist for early recognition and treatment of acute illness on treatment of critically ill septic patients in a low-resource medical intensive care unit. *Microb Drug Resist* 2021; 27:1203–1206
39. Schell CO, Khalid K, Wharton-Smith A, et al; EECC Collaborators: Essential emergency and critical care: A consensus among global clinical experts. *BMJ Glob Health* 2021; 6:e006585
40. Nakanishi N, Liu K, Hatakeyama J, et al: Post-intensive care syndrome follow-up system after hospital discharge: A narrative review. *J Intensive Care* 2024; 12:2
41. Huxford C, Hwang B, Dunsmuir D, et al: Exploring two-way text messages for post-discharge follow-up and quality improvement in rural Uganda. *PLoS One* 2025; 20:e0322969
42. Ansermino JM, Pillay Y, Tagoola A, et al; Pediatric Sepsis CoLab: Implementation of smart triage combined with a quality improvement program for children presenting to facilities in Kenya and Uganda: An interrupted time series analysis. *PLOS Digit Health* 2025; 4:e0000466
43. Mawji A, Li E, Komugisha C, et al: Smart triage: Triage and management of sepsis in children using the point-of-care Pediatric Rapid Sepsis Trigger (PRST) tool. *BMC Health Serv Res* 2020; 20:493
44. Kwizera A, Baelani I, Mer M, et al; Sepsis in Resource-Limited Settings Workgroup of the Surviving Sepsis Campaign: The long sepsis journey in low- and middle-income countries begins with a first step…but on which road? *Crit Care* 2018; 22:64
45. Urayeneza O, Mujyarugamba P, Rukemba Z, et al; Sepsis in Resource-Limited Nations Workgroup of the Surviving Sepsis Campaign: Increasing evidence-based interventions in patients with acute infections in a resource-limited setting: A before-and-after feasibility trial in Gitwe, Rwanda. *Crit Care Med* 2018; 46:1357–1366

Copyright © 2026 by the Society of Critical Care Medicine and Wolters Kluwer Health, Inc. All Rights Reserved.